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van den Assem, M.J.; Potter van Loon, R.J.D.; van Dolder, Dennie

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Poker is more than just a game of chance

By: Rogier J.D. Potter van Loon, Martijn J. van den Assem and Dennie van Dolder

Is poker a game of chance or a game of skill? This is the key issue in the widespread controversy about the legality of the game and the appropriate taxation of winnings. Ask any player, and he will assure you that poker is a skill game. On the other hand, legislation and jurisdiction often claim otherwise. Are players blinded by their enthusiasm, or do they have a point?



In our paper, *Beyond Chance? The Persistence of Performance in Online Poker*, we quantitatively analyze the role of skill in the performance of online poker players, using a large database with hundreds of millions of observations from real money games. We have recently distributed our working paper via SSRN at ssrn.com/abstract=2129879.

Our results provide strong evidence against the hypothesis that poker is a game of pure chance. In such a game there would be no correlation in the winnings of players across successive time intervals. To test for possible persistence in performance, we split up our sample of twelve consecutive months of data into subperiods. When we compare players' performance in time, we find that players who rank higher in performance over a given period perform better during the subsequent period. Players from the best decile over the first six months of our sample period, for example, win substantially more money during the next six months than players from the worst decile. When we rank players on the basis of how well they did according to our most accurate performance measure, we find that a player who is in the top ten percent in the first six-month period is more than two times as likely as other players to rank among the top ten percent in the next period. Also, they are more than two times less likely to rank among the worst ten percent. A top one percent player is more than twelve times as likely to end up in the top one percent the next period and more than four times as likely to end up in the top ten percent. Those who perform the worst in a given period often continue to lose and hardly ever turn into the best performing players in the next period.

We have also estimated various regression models, where current performance is explained by variables that are based on historical data. The results reinforce the above findings and show that current performance is not only related to historical performance but also to two simple measures of playing style. In addition, performance is related to the number of hands that subjects have played over the previous period: more frequent or experienced players achieve better results. This latter finding can indicate that better players choose to play more and that players learn from playing. Both interpretations conflict with the pure-chance hypothesis.

Under our standard regression approach, only a minor part of the differences in players' performance is captured by the explanatory variables, which suggests that the role of skill is relatively unimportant compared to the role of chance. However, the low empirical fit is partly attributable to measurement error in the explanatory variables. Furthermore, the fit improves when performance is measured over greater volumes of hands per player. For the performance of large groups of players combined, the (rank) correlation between past and current performance is near-perfect or even perfect. This implies that if sufficiently many hands are played, skill explains practically all variation in performance.

For further background about the analyses and the results we refer to our paper. All things considered, we believe that we can legitimately conclude that skill is an important factor in poker. Our study has been limited to online cash game play, but given the many similarities we think that our conclusion can be safely generalized to brick-and-mortar play and tournament poker. If legislators and judges would declare poker a game of skill, that would lift the taboo on the game, take away uncertainty among players about legality and taxation, and pave the way for online poker to develop into a well-regulated industry with reliable operators.

Rotterdam, August 27, 2012

Reference: Potter van Loon, Rogier J.D., Van den Assem, Martijn J. and Van Dolder, Dennie, *Beyond Chance? The Persistence of Performance in Online Poker*. Working paper, available at ssrn.com/abstract=2129879.